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The Fertilizer Supply

Nitrogen Phosphate Potash

1979-80

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THE FERTILIZER SUPPLY, 1979-80 1/

SUMMARY

Net domestic supplies of fertilizer plant nutrients--nitrogen (N), phosphate (P₂O₅), and potash (K₂O)--in the 1979-80 fertilizer year are expected to total 26.5 million short tons. This is 14 percent more than last year's supply and 21 percent more than the supply 2 years ago.

Based on trends during the first half of the year, estimated supplies of nitrogen (N) totaled 11,787,000 short tons, up 8 percent from last year's total and 12 percent above the supply 2 years ago. Natural gas curtailments have been the smallest in recent years. However, a number of domestic plants have been shut down. Some producers have been able to buy ammonia cheaper than they can produce it because of increased natural gas costs. Some Western European plants have cut back because of the high price for naphtha. Domestic producers shipped ammonia to this market during the first 7 months of the fertilizer year.

Interruption of scheduled ammonia imports from the USSR in early 1980 had an impact on spring supplies. The grain export suspension to the USSR and increased N prices may diminish N demand.

One or two of the idle domestic plants may start up before the fertilizer year ends, but production from restarted plants is not likely to have great influence on the supply available for spring planting. Farmers may not be able to get a specific material on short notice.

Phosphate (P₂O₅) supplies are expected to total 6,793,000 short tons of P₂O₅, up 17 percent from last year and up 31 percent from the total 2 years ago. Domestic sales and exports have been brisk during the first 6 months of the fertilizer year. Inventories are currently down, but if spring demand fails to materialize, inventories will build.

The embargo on phosphatic fertilizers to the USSR has added supplies to the phosphate market. An indefinite embargo was ordered on February 25, 1980. The quantity of the withheld P₂O₅ which finds its way into the domestic market is dependent on the strength of the world market for phosphates and ability of the industry to distribute the product where it is needed. Producer inventories had not been rebuilt through December; however, evidence suggests that retail inventories are up.

1/ The fertilizer year is from July 1 through June 30.

Potash (K_2O) supplies are expected to total 7,881,000 short tons of K_2O , 19 percent more than a year ago and up 29 percent from the total 2 years ago. Imports of potassium chloride are expected to be 18 percent more than last year. Potash Corporation of Saskatchewan has arranged to move potassium chloride to its terminals in the United States by unit-train. The turn around time on cars is 8 days compared with 40 days for "single car shipments." This appears to be equivalent to increasing the car fleet five times; however, the potassium chloride has to be moved from terminals to distribution points. The short distance hauls can be handled by truck and the unit-train should make for more efficient use of available rail cars. Supplies from domestic production are expected to be 13 percent more than the supply last year.

Beginning inventories (July 1, 1979) were smaller than last year for practically all kinds of fertilizers. Inventories had not been rebuilt through December.

NITROGEN (N)

Net domestic supplies of nitrogen (N) for fertilizer use are expected to total 11,787,000 tons in the 1979-80 fertilizer year. This is 8 percent more than was available last year and 12 percent above supplies 2 years ago (table 1). Supplies from domestic production are estimated to exceed last year's level by 7 percent, with imports up 4 percent and exports about the same.

Supply from domestic production - Supplies of N from domestic production are expected to total 12,027,000 tons (table 1). The supply of liquid nitrogen, estimated to be about two-thirds of the total domestic supply of N, is expected to be 7,688,000 tons, up 4 percent over last year's supply. Anhydrous ammonia shipped as such for fertilizer use is expected to be about the same as shipments last year and 16 percent more than the amount shipped 2 years ago. Production of all other liquid nitrogen is expected to increase by 12 percent.

Domestic production of solid nitrogen is estimated to total 4,339,000 tons in the current fertilizer year, representing a 13 percent increase over the amount produced a year ago. Ammonium nitrate supplies are expected to be down 7 percent from last year, ammonium sulfate down 2 percent, and solid urea for fertilizer use up 41 percent.

Production of other solid nitrogen-bearing materials, largely ammonium phosphates, is expected to be up 8 percent.

Imports - Total nitrogen imports for the fertilizer year are estimated to be 2,241,000 tons of N, 4 percent more than total imports in 1978-79. Imports of anhydrous ammonia are estimated to be up 7 percent from last year's total and 76 percent above the level of 2 years ago. Imports of ammonium nitrate and urea are expected to exceed last year's levels by 3 and 5 percent, respectively. A decrease of 61 percent is expected for nitrogen solutions, 13 percent for ammonium sulfate, and 19 percent for sodium nitrate compared with last year's total.

Exports - Nitrogen exports are expected to total 2,481,000 tons of N, about the same as last year. Anhydrous ammonia and nitrogen solution exports are expected to be up 18 percent and 32 percent, respectively, from those of last year. All other materials are expected to be down from last year with ammonium nitrate exports expected to be down 18 percent. Urea is also expected to be down 6 percent, ammonium sulfate down 12 percent, while all other materials are expected to be down 2 percent. This is the second year that nitrogen solutions were exported in any significant quantity.

Nitrogen capacities - Domestic anhydrous ammonia production capacity was estimated at 23.6 million tons of anhydrous ammonia (NH₃) on January 1, 1980, a decrease of 1 percent from 1979. Currently, some of the plants are not operating.

Table 1.--Nitrogen: Estimated supply of N for fertilizer purposes, United States, fertilizer years, 1977-78, 1978-79, and 1979-80

Item	1977-78 <u>1/</u>	1978-79 <u>1/</u>	1979-80	Percent change in 1979-80 from	
				1978-79	1977-78
	1,000 short tons	1,000 short tons	1,000 short tons	Percent	Percent
Supply from domestic production:					
Liquids:					
Ammonia (including aqua)	4,063	4,726	4,728		+ 16
All other	2,322	2,650	2,960	+12	+ 27
Total liquids	6,385	7,376	7,688	+ 4	+ 20
Solids:					
Ammonium nitrate <u>2/</u> <u>3/</u>	1,044	1,137	1,053	- 7	+ 1
Ammonium sulfate <u>3/</u>	497	509	499	- 2	
Urea	1,001	1,201	1,697	+41	+ 70
All other <u>4/</u>	1,539	1,006	1,090	+ 8	- 29
Total solids	4,081	3,853	4,339	+13	+ 6
Total liquids and solids	10,466	11,229	12,027	+ 7	+ 15
Imports:					
Ammonia (including aqua)	865	1,424	1,519	+ 7	+ 76
Nitrogen solutions	161	56	22	-61	- 86
Ammonium nitrate	100	92	95	+ 3	- 5
Ammonium sulfate	69	54	47	-13	- 32
Urea <u>3/</u>	513	391	411	+ 5	- 20
Sodium nitrate	23	21	17	-19	- 26
All other	135	121	130	+ 7	- 4
Total	1,866	2,159	2,241	+ 4	+ 20
Exports:					
Ammonia (including aqua)	467	454	534	+18	+ 14
Ammonium nitrate	11	28	23	-18	+109
Ammonium sulfate	137	232	204	-12	+ 49
Urea	422	713	670	- 6	+ 59
Nitrogen solutions		96	127	+32	
All other	741	945	923	- 2	+ 25
Total	1,778	2,468	2,481		+ 40
Net domestic supply	10,554	10,920	11,787	+ 8	+ 12

1/ Revised.

2/ Includes ammonium nitrate and ammonium nitrate-limestone mixtures.

3/ Adjusted for estimated quantity going into nonfertilizer uses.

4/ To avoid duplication, the figure for "all other" solids has been adjusted by the estimated amount of imported ammonia used in primary materials.

Urea capacity was estimated to be 7.5 million tons of material, 6 percent below a year ago. Ammonium nitrate capacity was estimated to be 10.6 million tons. About 1.2 million tons of ammonium nitrate is used to produce industrial material. The 9.4 million tons which is used for making fertilizer grade material is divided into 52 percent liquid and 48 percent solid.

PHOSPHATE (P_2O_5)

Net domestic supplies of phosphate (P_2O_5) are expected to total 6,743,000 tons in the 1979-80 fertilizer year, 17 percent more than was available last year, and 31 percent more than the amount 2 years ago (table 2). Imports are estimated to be 282,000 tons of P_2O_5 , up 19 percent from imports in 1978-79 and up 23 percent from those in 1977-78. Exports are expected to total 3,694,000 tons of P_2O_5 , down 5 percent from the total a year ago and 11 percent above the total in 1977-78.

Normal superphosphate - Total supplies of normal and enriched superphosphate from domestic production are estimated to total 349,000 tons of P_2O_5 , 9 percent more than last year's supply (table 2). Imports and exports will be negligible.

Concentrated superphosphate - Supplies of concentrated superphosphate from domestic production are expected to total 1,780,000 tons of P_2O_5 , down 6 percent from the supply last year. Imports are estimated to be 114 percent above last year's level. Exports are expected to be 2 percent more.

Ammonium phosphate - Domestic supplies of ammonium phosphate are expected to total 5,452,000 tons of P_2O_5 , 7 percent more than the total in 1978-79 and 20 percent more than the total 2 years ago. Imports are estimated to be 148,000 tons (15 percent) more than last year, and exports 2,192,000 tons (3 percent) less.

Phosphoric acid - Wet-process phosphoric acid is the basic P_2O_5 material used in the manufacture of high-analysis phosphatic fertilizers. Production is up 8 percent from last year. The rate of use of this acid in concentrated phosphatic fertilizer materials and shipments to other fertilizer producers for further processing during the second half of the 1979-80 fertilizer year will determine changes in the operating rate from that of the first half.

Supplies of phosphoric acid available for sale (estimated to be 25 percent of production) to primary fertilizer producers without phosphoric acid facilities, and to secondary fertilizer producers, continues to

Table 2.--Phosphate: Estimated supply of P₂O₅ for fertilizer purposes, United States, fertilizer years, 1977-78, 1978-79, and 1979-80

Item	1977-78 <u>1/</u>	1978-79 <u>1/</u>	1979-80	Percent change in 1979-80 from	
				1978-79	1977-78
	1,000 short tons	1,000 short tons	1,000 short tons	Percent	Percent
Supply from domestic production:					
Normal and enriched superphosphate	303	320	349	+ 9	+ 15
Concentrated superphosphate	1,768	1,901	1,780	- 6	+ 1
Ammonium phosphate <u>2/</u>	4,548	5,082	5,452	+ 7	+ 20
All other <u>3/</u>	1,626	2,129	2,624	+ 23	+ 61
Total	8,245	9,432	10,205	+ 8	+ 24
Imports:					
Concentrated superphosphate	16	7	15	+114	- 6
Ammonium phosphate	147	129	148	+ 15	+ 1
All other	66	100	119	+ 19	+ 80
Total	229	236	282	+ 19	+ 23
Exports:					
Normal superphosphate	3	6	6		+100
Concentrated superphosphate	659	726	740	+ 2	+ 12
Ammonium phosphate	1,794	2,259	2,192	- 3	+ 22
All other	834	857	700	- 18	- 16
Total	3,290	3,848	3,694	- 5	+ 11
Net domestic supply	5,184	5,820	6,793	+ 17	+ 31

1/ Revised.

2/ Liquid and solid ammonium phosphate, excluding those combined with potash salts in the process of manufacture.

3/ Includes nitric phosphates, sodium phosphate, wet base goods, natural organics, phosphate rock, colloidal phosphate, basic slag, estimates of wet-process and furnace phosphoric acid for liquid and solid mixed fertilizers, and direct application, and ammonium phosphates combined with potash salts in the process of manufacture.

be a major segment of the total P_2O_5 supply. Secondary manufacturers use phosphoric acid to produce solid mixtures, solid N-P base materials (including ammonium phosphate), liquid N-P base materials (including ammonium phosphate and ammonium polyphosphate), liquid mixed fertilizers, and an insignificant amount for direct application.

Phosphate capacities - Normal superphosphate capacity in operating plants was estimated to be about 566,000 tons of P_2O_5 on January 1, 1980. Concentrated superphosphate capacity was estimated to be 2.4 million tons of P_2O_5 . Currently a few plants are idle.

Ammonium phosphate capacity in plants operated by primary producers was estimated to be about 5.4 million tons of P_2O_5 , about the same as last year's capacity. Available information is not sufficient to reliably estimate capacity of other plants operated by secondary producers which manufacture ammonium phosphate primarily for their own use in mixed fertilizers (solid and liquid) and liquid ammonium polyphosphate.

Wet-process phosphoric acid capacity in operating plants was estimated to be 9.9 million tons of P_2O_5 on January 1, 1980, 2 percent above a year ago.

These estimates of P_2O_5 capacities are based on current production of phosphatic materials. However, capacities may shift, within limits, from one material to another since phosphoric acid is the basic P_2O_5 source for the production of all concentrated phosphatic materials except nitric phosphate.

Within limits, market conditions govern division of the output of phosphoric acid into concentrated superphosphate, various grades of ammonium phosphate, liquid base N-P materials, or sales of phosphoric acid to secondary fertilizer manufacturers.

POTASH (K_2O)

Net domestic supplies of potash (K_2O) in 1979-80 are expected to total 7,881,000 tons, 19 percent more than supplies last year and 29 percent more than supplies 2 years ago (table 3). Imports are expected to total 5,975,000 tons of K_2O , up 18 percent from the level in 1978-79. Exports are expected to be 945,000 tons of K_2O , 5 percent less than the previous year's total.

Potassium chloride - Supplies of domestically produced potassium chloride (muriate of potash) are expected to total 2,286,000 tons of K_2O (table 3), 10 percent more than last year's total and 29 percent more than that of

Table 3.--Potash: Estimated supply of K₂O for fertilizer purposes, United States, fertilizer years, 1977-78, 1978-79, and 1979-80

Item	1977-78 <u>1/</u>	1978-79 <u>1/</u>	1979-80	Percent change in 1979-80 from	
				1978-79	1977-78
	1,000 short tons	1,000 short tons	1,000 short tons	Percent	Percent
Supply from domestic production:					
Potassium chloride	1,770	2,082	2,286	+10	+29
Potassium sulfate <u>2/</u>	371	402	530	+32	+43
All other	35	35	35		
Total	2,176	2,519	2,851	+13	+31
Imports:					
Potassium chloride	4,890	5,017	5,924	+18	+21
Potassium sulfate <u>2/</u>	15	20	11	-45	-27
All other	43	46	40	-13	-7
Total	4,948	5,083	5,975	+18	-21
Exports:					
Potassium chloride	751	711	676	-5	-10
Potassium sulfate <u>2/</u>	234	261	240	-8	+3
All other	18	27	29	+7	+61
Total	1,003	999	945	-5	-6
Net domestic supply	6,121	6,603	7,881	+19	+29

1/ Revised.

2/ Includes potassium-magnesium sulfate.

2 years ago. Imports are expected to be up 18 percent, and exports down 5 percent. If exports are subtracted from domestic production, only 24 percent of the net domestic supply will be from domestic production. Practically all of the remaining 76 percent will be imported from Canada.

Potassium sulfate - Supplies of potassium sulfate and potassium magnesium sulfate from domestic production are expected to total 530,000 tons of K_2O in 1979-80, 32 percent more than last year's supply and 43 percent more than the supply 2 years ago. Imports are expected to be down 45 percent and exports down 8 percent.

Potash capacities - U.S. potash production capacity was estimated to be 2,705,000 tons of K_2O as of January 1, 1980.

Canadian capacity was estimated to be about 8.8 million tons of K_2O . The Provincial Government of Saskatchewan has purchased three mines and their facilities and has purchased an interest in two other companies. The Provincial Government owns about 38 percent of current Canadian capacity. It plans to expand operations of the three wholly owned facilities.

INVENTORIES

Inventories of nitrogen and phosphate materials are reported monthly by the Bureau of the Census. Inventories of each nitrogenous material are stocks held by producing companies at plants and other locations.

Phosphate material inventories are the stocks at producing locations only. Monthly potash inventories are not available from Government sources. Data are not available on inventories held by secondary manufacturers, distributors, and dealers.

Nitrogen - The inventory of anhydrous ammonia at the end of June 1979 was 1,470,314 tons, down 12 percent from 1978 and up 35 percent from 1977 (table 4). The inventory of anhydrous ammonia at the end of December 1979, the middle of the current fertilizer year, was 2,163,065 tons, down 15 percent from 1978, and down 22 percent from the level of 2 years ago.

Stocks of ammonium nitrate in June 1979 were 37 percent below stocks in 1978, but up 7 percent over that of 1977. Ammonium sulfate stocks at the end of December 1978 were 91 percent above stocks 2 years ago. Nitrogen solution stocks in June 1979 were down 26 percent from 1978, but up 75 percent from 1977.

Table 4.--Inventories of selected fertilizer materials, United States, end of June, December, and February 1/

Material	Unit	Beginning inventory			Mid-fertilizer year inventory			Inventory build-up for spring season	
		For end of June			For end of December			For end of February	
		1977	1978	1979	1977	1978	1979	1978	1979
Anhydrous ammonia	Tons of material	1,087,871	1,671,078	1,470,314	2,760,494	2,533,935	2,163,065	3,278,475	2,960,453
Ammonium nitrate, solid	"	124,536	211,654	133,493	391,971	356,861	263,946	412,951	388,381
Ammonium sulfate	"	173,757	231,687			334,069			
Ammonium sulfate, coke oven	"		40,000	57,000	57,000			49,000	93,000
Nitrogen solutions	Tons of N	209,074	493,028	365,301	642,779	619,670	486,546	654,755	718,769
Urea	"		215,454	291,185			357,039	309,853	431,138
Phosphoric acid, wet-process	Tons of P ₂ O ₅	153,101	173,536	181,954	173,128	187,637	231,218	197,843	190,684
Total phosphates	"	428,179	494,212	397,325	573,141	491,704	371,381	571,202	435,127
Normal & enriched superphosphates	"	42,976	30,429	35,456	56,723	42,177	33,707	55,351	45,073
Concentrated superphosphates	"	127,495	137,222	115,380	177,761	121,877	106,600	154,455	105,336
Ammonium phosphates	"	242,928	306,097	236,132	322,686	310,485	218,985	338,246	267,939
Other phosphates	"	14,780	20,464	10,357	15,971	17,165	12,089	23,150	16,779

1/ Current Industrial Reports, Inorganic Fertilizer Materials and Related Acids, M28B, Bureau of the Census.

Phosphate - The June 1979 wet-process phosphoric acid inventory was up 5 percent from the inventory of 1978 and up 19 percent over the level in 1977 (table 4).

June 1979 stocks of total phosphates were 20 percent less than stocks in 1978, and down 7 percent from the 1977 level of 428,179 tons. June 1979 inventories of normal superphosphates were up 17 percent from 1978 and down 17 percent from 1977. June 1979 concentrated superphosphate stocks were down 16 percent from last year and down 10 percent from 2 years ago. Ammonium phosphate stocks in 1979 were down 23 percent from 1978 and down 3 percent from 1977.

FOREIGN TRADE IN FERTILIZER

U.S. imports - Seventy-five percent of total fertilizer imports came from Canada in 1978-79 (table 5). Over 75 percent of this Canadian total was potassium chloride. U.S. companies, or their subsidiaries in Canada, and subsidiaries of Canadian companies in the United States are responsible for a large share of the imports. Countries other than Canada are the major sources of imported nitrogen solution, calcium nitrate, potassium nitrate, potassium-sodium nitrate, potassium sulfate, and sodium nitrate. Mexico continues to be the major import source of phosphoric acid (see footnote 1, table 5).

Imports of anhydrous ammonia, calcium nitrate, phosphate crude, phosphoric acid, potassium chloride, potassium sulfate, potassium nitrate, and mixed fertilizer showed gains in 1978-79 over the previous year (table 6). Anhydrous ammonia imports have increased over 190 percent the last 5 years. Imports of urea were down 24 percent from 1977-78. In 1978-79, there were decreases in imports of ammonium nitrate, ammonium nitrate-limestone, ammonium sulfate, calcium cyanamide, nitrogen solution, sodium nitrate, synthetic nitrogenous material not elsewhere classified, urea, ammonium phosphate, and potassium-sodium nitrate.

Imports of phosphate rock, potassium chloride, anhydrous ammonia, ammonium phosphates, and mixed fertilizer have increased in significant quantities during the first half of the current fertilizer year. The investigation of fertilizer trade with the USSR had threatened to reduce the imports of anhydrous ammonia and potassium chloride. These materials were expected in exchange for superphosphoric acid going to the Soviet Union. Although superphosphoric acid exports have been suspended, anhydrous ammonia continues to be imported into the United States.

Table 5.--U.S. imports of selected fertilizer materials by country of origin, fertilizer year 1978-79 1/

Country of origin	Ammonium sulfate	Ammonium nitrate	Anhydrous ammonia	Urea	Calcium nitrate	Nitrogen solutions	Potassium chloride	Potassium sulfate	Potassium sodium nitrate	Mixed fertilizers
-----Short tons of material-----										
Canada	187,453	241,940	549,134	753,018	191	56,228	8,040,485	165	233	143,026
Mexico			380,803							44
Dominican Republic										
Trinidad and Tobago	1,660		303,835	49,161						
Bahamas				2	6,821					
Chile				29,894	88,130				40,883	30,805
Norway	1,200	4,331								2
Finland					40	4,721				1
United Kingdom					9,987	122,091				6
Netherlands	21,572	28,048		209,540		4,000				
Belgium-Lux	25,786			1,781				16,533		
France								15,240		256
West Germany	19,251			14			17,238			
East Germany				16			59,210			
Austria							13,346			
USSR			451,532				33,454			
Spain										
Italy				41,816				7,937		
Israel										
Yemen				1,839	30				68	100
Japan										
Netherland Antilles			37,660							
Colombia			12,100							
India				2,821						
Belize					20		10,627			
Denmark										
Total	256,922	274,319	1,735,064	1,089,902	105,219	187,040	8,427,164	39,875	41,184	174,240

1/ Other materials imported were the following: 6 tons dried blood; 30 tons manure, including guano; 2,008 tons calcium cyanamide; 129,714 tons sodium nitrate; 17,648 tons basic slag; 4,620 tons bone ash, dust, meal; 860,751 tons phosphate crude, NES; 58,328 tons potassium nitrate; 46 tons ammonium-nitrate-limestone; 54,238 tons other nitrogen fertilizer; 103,169 tons liquid phosphate; 11,995 tons normal superphosphate; 15,807 tons concentrated superphosphate; 1,076 tons potassic fertilizer, NSPF; 114,587 tons diammonium phosphate; 185,270 tons other ammonium phosphate; and 31,508 tons fertilizer materials, NSPF.

Table 6.--U.S. imports of selected fertilizer materials, fertilizer years 1974-75 through 1978-79

Material	1974-75	1975-76	1976-77	1977-78	1978-79
-----Short tons of material-----					
Ammonium nitrate	316,227	295,435	346,929	299,558	274,319
Ammonium nitrate-limestone	189,945	22,115	60,782	16,090	46
Ammonium sulfate	248,232	420,325	454,129	329,647	256,922
Anhydrous ammonia	598,292	766,761	967,533	1,054,072	1,735,064
Calcium cyanamide	58,550	37,570	1,517	2,078	2,008
Calcium nitrate	116,160	71,953	68,409	100,336	105,219
Nitrogen solutions	91,669	187,813	444,481	537,728	187,040
Sodium nitrate	201,520	89,098	138,904	146,564	129,714
Synthetic nitrogenous materials, nec	109,327	128,936	113,773	85,315	54,238
Urea	811,842	527,602	1,466,083	1,430,197	1,089,902
Ammonium phosphate	247,017	339,669	387,005	342,731	299,857
Phosphate, crude	79,879	35,505	56,627	694,513	860,751
Phosphoric acid	138,051	64,530	52,364	55,592	103,169
Potassium chloride	6,358,650	6,466,266	8,210,835	8,214,847	8,427,164
Potassium-sodium nitrate	16,387	39,414	45,965	41,309	41,184
Potassium sulfate	50,556	63,104	92,776	29,346	39,875
Potassium nitrate	23,626	30,404	7,907	57,369	58,328
Mixed fertilizers	290,949	105,704	129,231	142,737	174,240

U.S. exports - Phosphate rock exports decreased 4 percent in 1978-79 (table 7). Canada, South Korea, and Japan took nearly 7.1 million tons, or 48 percent of the total. These three, with 10 other countries, took 91 percent of the phosphate rock exports. In addition, Italy, India, Sweden, and Denmark took 277,000, 220,000, 130,000, and 129,000 tons, respectively, of phosphate rock, or 5.1 percent of the total.

Concentrated superphosphate and potassium chloride exports in 1978-79 amounted to over 1 million tons and exports of ammonium phosphate totaled more than 5 million tons for the first time, up 23 percent from 1977-78 and up 123 percent in the last 5 years (table 8). Exports increased for a majority of the fertilizer materials. Urea was up 69 percent, ammonia nitrate 164 percent, normal superphosphate 101 percent, and mixed fertilizer up 59 percent from 1977-78.

Anhydrous ammonia (industrial grade), phosphate rock, and potassium chloride, were the only materials exported which did not show gains in 1978-79. Anhydrous ammonia exports only increased 6 percent in 1978-79 compared to a 90-percent increase the previous year. Exports of ammonium sulfate were up 69 percent. Phosphoric acid increased only 1 percent compared with a 70-percent increase the previous year.

About 24 percent of all plant nutrients (excluding phosphate rock) exported in 1978-79 went to countries with agricultural programs sponsored by the Agency for International Development (AID) (table 7). This compares with 29 percent in 1977-78.

Over 31 percent of the phosphoric acid (fertilizer grade) exported, 20 percent of the ammonium sulfate, 43 percent of the urea, 11 percent of the potassium chloride, and 42 percent of the mixed fertilizer went to developing countries in which AID had active agricultural programs (table 7). AID-financed fertilizer exports to only six of these countries. However, AID did not necessarily finance all of the fertilizer exported to these countries. In fact, AID-financed fertilizer commitments of U.S. origin materials represent only 3 percent of the total U.S. exported fertilizer products in 1979.

During the first half of the current year, anhydrous ammonia exports were more than double for the same period last year. The Western European market became attractive. Producers cut back production because of increased prices of naphtha. Phosphoric acid exports were up 7 percent during the first half of the fertilizer year. The Government ordered an indefinite embargo on exports of phosphoric fertilizers to the USSR on February 25, 1980. Some of the production scheduled for the Soviets may go to other countries and a portion may be diverted to the domestic market.

Table 7.--U.S. exports of selected fertilizer materials by country of destination, fertilizer year 1978-79 1/

Country of destination	Ammonium sulfate	Ammonium nitrate	Anhydrous ammonia		Urea	Phosphate rock (all)	Nitrogen solution	Concentrated super-phosphate	Ammonium Phosphate		Phosphoric acid (P2O5) (fert. grade)	Potassium chloride	Mixed fertilizers
			Fertilizer grade	Aqua					Orthoammonium phosphate	Other ammonium phosphate			
Canada	19,008	8,813	58,164	791	76,474	3,627,311	6,909	108,757	204,332	106,482	9,712	1,468	83,503
Mexico	48,930	1,845	37,761	52	11,331	367,846	48		181,679	78,105	5	1,957	1,957
Guatemala 2/	1,345	15	22	2	16,018	14,388		22,502	22,502	13,073		7,546	7,546
El Salvador 2/	17,966	25	4	9	24,212	14,388		52,382	52,382	13,073		12,654	10,204
Costa Rica 2/	19	32	19	9	5,754	5,754		8,488	31,847	24		33,521	35
Dominican Republic 2/	74,469	927	121	30	22,198	6	3,111	5,089	30,528	7,450		28,170	135
North America, other 4/	3,890	1,910	5,524	361	30,429	135	606	3,506	23,775	11,812	3	9,964	14,486
Venezuela 2/	11,803	3,156	47	14	156	65,663		18,212	53,969	16,637	19,466	36,443	75
Ecuador 2/	32,897	4,061			9,447	10,848	107	2,748	11,574	10,962	2	11,721	105
Peru 2/		274			60,784	15,424		14,029	17,945	80		1,885	
Chile 2/								11,120	27,119	608			
Brazil	782,979	36,594	87,162		367,307	315,051	3	288,630	492,742	19,985	266,210	578,978	27
Uruguay 2/	4,293	4,293			4,581	28,319		19,341	44,813	921		2,537	11,285
Argentina	237	2,550	157	166	10,027	551		25,353	85,208	3,189		3,205	26
South America, other 4/	1,438	2,692				1,508		5,567	1,656			1,046	
Sweden						130,211	17,234	6				500	
Norway			17,694			122,181							
Finland						59,930							
Denmark						129,163							
United Kingdom			81,200		40,137	443,078	138	12		2,436			47
Ireland					5,492	9,934		73,908	61,365	11,519		33,817	56
Netherlands		2	11,218	11		630,756		13,548	41,196	33	4,950		11,330
Belgium - Luxembourg	47		3,683			905,285	262,311	130,252	432,519	9,507		17,150	30,023
France	16	20,217	25,022		2	959,984	27,964	78,521	253,836	2,974		10,990	24
West Germany			96		5,497	1,062,160		142,010	42,239		5,914		6,782
Hungary								143,696					
Poland						875,651							
Spain			94,231			38,867		106,218	28,255	8,355			11
Czechoslovakia								42,413	92,850				
Yugoslavia						276,528		35,042	788,308	42,179	208,060	13,184	132
USSR													
Romania						603,503		27,488	355,351	1,997	23,442		476
Turkey		1	83,785		14	4,026			411,729			40	
Europe, other 4/			2,347			219,990			139,817	27,258	217,289		
India 2/	74,184		17		432,632				91,937				
Pakistan 2/ 3/				1					48,442	118,336	99		36,714
Bangladesh 2/ 3/				33	22,708					21			11
Thailand 2/ 3/					34,516								2
Sri Lanka (Ceylon) 2/ 3/					42,649			1,102					6,120
Malaysia						22,585		82,621				444	16
Indonesia 2/	12,125					100,719			1	2,539	3	179	
Philippines 2/	9							34,721	136,252				8
China					265,195								53
Korea, Republic of 2/			4			1,759,315			5,787	10		23,147	708
China (Taiwan)		11		177	11	52,544			159,850	17,074		63,197	
Japan			344	219		1,703,190	71	42,301	4,388	305	4	1,037	139
Asia, other 4/	6,164	168	18	272	5,539	202,748	26	1,194	65,954	122	7	5,757	138
Australia	226	80			18,560	85,286			20,923	22,858		193,970	54
New Zealand	9,821		2	61	31,703					99			12
Oceania, other 4/												87	
Algeria			20,174						98,311	2,857			18,464
Ghana 2/									21,149				16
Ethiopia 2/													
Mozambique													
Zambia 2/ 3/									3,235	5,941			56,186
Africa, other 4/	560	644	22,284	188	583	220	62	2,259	33,506	12,395	20	518	357
Total	1,103,065	84,019	553,100	2,367	1,549,596	14,882,327	318,590	1,577,387	4,531,375	469,533	755,191	1,165,706	309,618
Countries with AID Programs 2/	220,946	5,335	230	89	669,840	483,696	3,216	268,135	1,078,962	192,888	236,864	128,646	129,536
Percent to AID countries	20	6	43	4	43	3	1	17	24	41	31	11	42
Countries where AID financed at least part of fertilizers 2/	4,293		17	1	61,805	28,319		19,341	276,567	6,883		2,537	74,660

1/ Other exports: 57,442 tons sodium nitrate; 27,402 tons nitrogenous fertilizer and fertilizer material; 29,110 tons normal superphosphate; 522,549 tons potassium sulfate; 460 tons basic slag; and 105,911 tons organic fertilizers.

2/ Countries with active ATO agricultural programs.

3/ Countries which received ATO financed fertilizer, but not necessarily all that was exported to each country.

4/ Includes AID and non-AID countries.

Table 8.--U.S. exports of selected fertilizer materials, fertilizer years 1974-75 through 1978-79

Material	1974-75	1975-76	1976-77	1977-78	1978-79
-----Short tons of material-----					
Anhydrous ammonia	276,840	254,554	291,063	523,519	553,100
Fertilizer, grade	83,974	71,389	154,772	47,786	2,367
Industrial	22,349	61,471	11,065	31,844	84,019
Ammonium nitrate	571,637	751,956	490,998	651,686	1,103,065
Ammonium sulfate	3,799	959	1,206	18,305	57,442
Sodium nitrate	449,982	580,524	367,925	917,136	1,549,596
Urea	22,412	22,259	24,124	22,944	27,402
Synthetic nitrogenous materials, nec	-----	-----	-----	7,916	318,590
Nitrogen solutions	22,410	22,218	24,124	22,944	27,402
Nitrogen fertilizer and fertilizer	13,393,246	11,747,642	12,758,000	15,577,845	14,882,327
materials	232,683	310,669	444,513	751,443	755,191
Phosphate rock	21,023	22,104	7,044	14,472	29,110
Phosphoric acid (fert. grade)	1,107,419	1,224,976	1,242,187	1,432,616	1,577,387
Normal superphosphate	2,241,758	2,721,085	3,167,711	4,059,098	5,000,908
Concentrated superphosphate	1,014,968	1,187,834	1,296,424	1,230,407	1,165,706
Ammonium phosphate	350,144	332,518	349,909	467,825	522,550
Potassium chloride	496,896	218,175	223,720	194,219	309,618
Potassium sulfate					
Mixed fertilizers					

U.S. historical trade balance - The United States shifted from a net importer of nitrogen (N) to a net exporter in 1966 (table 9). The shift resulted primarily from the increased emphasis on the use of fertilizers in the AID program. A reduction in AID requirements in 1969-70 caused the first decline in N exports since 1962-63. The decline was reversed in 1972-73 by the worldwide food shortage and the need to increase food production. The United States became a net importer of N in 1974-75 due primarily to limited availability of foreign exchange for fertilizer purchases and to world economic conditions. However, the United States shifted back to being a net exporter in 1975-76, but became a net importer in 1976-77. With the strong export market, the U.S. again became a net exporter in 1978-79 and is projected to be the same in 1979-80.

U.S. exports accounted for about 55 percent of the processed fertilizer P_2O_5 in world trade in 1977-78 compared to 33 percent 5 years ago. U.S. phosphate rock exports decreased 4 percent in 1978-79 over the previous year, just slightly below the record level of 15.6 million short tons reached in 1977-78.

The United States had an export balance of K_2O from 1955-56 through 1961-62. Production from the then newly developed Canadian deposits shifted the net balance to imports in 1962-63. Since 1969-70, domestic production of potassium chloride (KCl) has been smaller than imports of KCl from Canada.

For the three primary fertilizer nutrients combined, the United States imported 7,478,000 tons and exported 7,315,000 tons in 1978-79, excluding phosphate rock. The United States is expected to import 8,498,000 tons and export 7,120,000 tons of these nutrients in 1979-80.

PRICES

Current and historical prices paid by farmers for fertilizer are available in "Agricultural Prices", issued periodically by the Economics, Statistics, and Cooperatives Service, United States Department of Agriculture. Wholesale or producer prices are more difficult to find. The published price lists of producers or wholesalers have usually contained conditions for discount and freight equalization which makes it difficult to determine net selling value f.o.b. plant. Further, the time period varies for which the price lists are effective or when they are superseded. Some trade publications have listed wholesale prices with no indication of amounts of discounts or freight equalization

Table 9.--U.S. imports and exports of primary plant nutrients, 1951-52 through 1979-80

Fertilizer	N		P ₂ O ₅ 1/		K ₂ O	
	Imports	Exports	Imports	Exports	Imports	Exports
	-----1,000 short tons-----					
1951-52	290	73	39	94	264	63
1952-53	429	44	41	74	159	54
1953-54	421	62	62	88	121	54
1954-55	373	141	61	154	139	91
1955-56	330	255	56	153	170	180
1956-57	294	268	54	256	179	315
1957-58	305	227	59	246	213	252
1958-59	294	223	64	204	238	310
1959-60	298	188	82	177	282	418
1960-61	276	213	67	238	285	484
1961-62	337	234	87	283	282	503
1962-63	344	196	117	275	486	411
1963-64	453	264	100	400	691	526
1964-65	470	392	98	432	884	625
1965-66	529	546	125	441	1,332	664
1966-67	669	749	165	787	1,643	678
1967-68	675	1,045	169	1,145	2,225	714
1968-69	690	1,594	183	995	1,944	798
1969-70	855	1,328	273	845	2,646	681
1970-71	929	1,077	283	898	2,510	620
1971-72	843	1,032	326	1,102	3,088	657
1972-73	882	1,508	312	1,422	3,192	922
1973-74	1,068	1,269	315	1,581	4,114	947
1974-75	1,198	1,115	274	1,861	3,847	848
1975-76	1,218	1,239	221	2,175	3,910	911
1976-77	1,842	1,251	245	2,501	4,955	994
1977-78	1,866	1,778	229	3,290	4,948	1,003
1978-79	2,159	2,468	236	3,848	5,083	999
1979-80*	2,241	2,481	282	3,809	5,975	945

* Estimated.

 Import Balance

 Export Balance

1/ Excluding phosphate rock.

Data in tables 10 through 22 reflect the trend in prices realized by producers. The annual surveys of the industry conducted by the Bureau of the Census provide data on shipments and interplant transfers and value f.o.b. plant and in some cases commercial shipments and value. Prices per ton in these tables are based on these data.

THE WORLD FERTILIZER MARKET

Concern about the world food shortages has intensified the interest in fertilizer as a means of increasing crop yields and thereby increasing total food production. Fertilizer is an important means for increasing needed food production in developing as well as developed countries.

World production of primary plant nutrients totaled over 105 million metric tons ^{2/} in 1977-78 (latest year for which world fertilizer data are available), an increase of 7 percent from 1976-77 and 22 percent more than output 5 years ago (tables 23, 24, and 25). Consumption totaled over 99 million metric tons in 1977-78, a 4-percent increase over consumption in 1976-77 and a 22-percent increase over the amount consumed 5 years ago.

The United States continued to rank number one in total production, imports, exports, and consumption of the primary plant nutrient N and number one in total production and export of P₂O₅ in 1977-78. The USSR used the most P₂O₅ and produced and used the most K₂O. The United States produced 18 percent of the world's plant nutrients and used 19 percent of them in 1977-78.

Nitrogen (N) - In 1977-78, the United States produced 20 percent of the world's supply of N for fertilizer, consumed 19 percent, and ranked number one as an importer and exporter (table 23). China ranks number two as an importer and number three as a producer and consumer. The Netherlands and Japan rank number two and three, respectively, as exporters. The United States and USSR rank number one and two, respectively, as producers and consumers. Half of the top 10 importers were developing countries. The following countries exported more N than was used at home: Japan, the Netherlands, Belgium-Luxembourg, Canada, and Romania.

Phosphate (P₂O₅) - The United States continued as the leading producer and exporter of P₂O₅ (excluding phosphate rock) in 1977-78 (table 24). It produced 25 percent and exported 55 percent of the world's fertilizer P₂O₅. The USSR ranked number two as a producer (19 percent) and number one as a consumer (18 percent) of the world's P₂O₅. France, Brazil, and West Germany are the leading importers of the world's P₂O₅. Only two of the top 10 importers, India and Pakistan, are developing countries. The following countries exported more P₂O₅ than they used at home: Belgium-Luxembourg, the Netherlands, Tunisia, and Morocco.

^{2/} Multiply metric tons by 1.1023 to convert to short tons.

Table 10--Anhydrous Ammonia - Shipments and interplant transfers, value f.o.b. plant and calculated price per ton 1/

Calendar Year	Shipments & interplant transfers			Commercial shipments only		
	Material (short tons)	Value <u>2/</u> (\$1,000)	Price/ton	Material (short tons)	Value <u>2/</u> (\$1,000)	Price/ton
1947	376,561	23,601	62.68	348,869	21,987	63.02
1950	636,828	51,326	80.60	424,679	36,126	85.07
1951	759,380	64,092	84.40	647,927	55,711	85.98
1952	966,936	82,267	85.08	741,762	64,945	87.56
1953	1,120,984	100,224	89.41	967,988	87,664	90.56
1954	1,284,894	114,836	89.37			
1955	1,553,651	130,710	84.13	1,330,417	114,047	85.72
1956	1,642,835	123,640	75.26	1,354,935	101,579	74.97
1957	1,744,564	123,726	70.92	1,437,924	102,611	71.36
1958	1,798,973	131,278	72.97	1,423,526	104,651	73.52
1959	2,202,081	153,196	69.57	1,778,692	124,153	69.80
1960	2,350,833	163,432	69.52	1,999,798	137,966	68.99
1961	2,565,926	184,305	71.83	2,172,537	155,317	71.49
1962	2,853,332	200,033	70.11	2,417,714	167,939	69.46
1963	3,464,766	238,655	68.88	3,039,728	207,498	68.26
1964	3,967,550	270,021	68.06	3,387,302	227,984	67.31
1965	4,881,116	329,242	67.45	4,090,552	273,380	66.83
1966	6,153,488	390,797	63.51	5,342,619	333,635	62.45
1967	6,964,998	381,878	54.83	5,885,139	327,112	55.58
1968	7,952,618	331,660	41.70	5,804,887	248,799	42.86
1969	8,467,690	288,067	34.02	6,134,697	208,826	34.04
1970	9,145,855	309,471	33.84	6,529,144	223,718	34.26
1971	9,453,063	322,049	34.07	6,462,896	227,267	35.16
1972	9,671,023	342,086	35.37	6,124,799	221,106	36.10
1973	9,266,090	395,469	42.68	6,429,478	289,147	44.97
1974	9,186,542	850,822	92.62	6,462,231	673,625	104.24
1975	9,157,261	1,357,884	148.29	6,952,726	1,057,014	152.03
1976	9,489,149	1,014,961	106.96	7,277,082	775,447	106.56
1977	10,013,074	1,017,853	101.65	7,921,200	808,292	102.04
1978	9,827,668	998,459	101.60	7,494,237	787,366	105.06

1/ Shipments and value from Inorganic Chemicals, Annual Reports, The Bureau of the Census, U.S. Department of Commerce.

2/ Value - Net selling value f.o.b. plant (after discounts and allowances and excluding freight charges which may be absorbed by the producer).

Table 11--Sulfuric acid, contact process gross 1/
Series MA-28A(74) Supp. 1

Calendar Year	Shipments & interplant transfers			Commercial shipments only		
	Material (short tons)	Value <u>2/</u> (\$1,000)	Price/ton	Material (short tons)	Value <u>2/</u> (\$1,000)	Price/ton
1947	5,161,795	67,749	13.13	4,849,659	63,093	13.01
1950	6,527,486	94,188	14.43	6,176,789	89,106	14.43
1951	6,694,552	113,394	16.94	6,399,831	108,992	17.03
1952	6,596,684	114,667	17.38	6,335,054	111,060	17.53
1953	7,079,036	132,351	18.70	6,864,586	128,835	18.77
1954	7,141,951	138,918	19.45	6,557,336	126,195	19.24
1955	8,847,877	170,954	19.32	8,332,981	161,005	19.32
1956	8,773,344	165,010	18.81	8,220,968	153,915	18.72
1957	8,828,072	162,422	18.40			
1958	8,621,570	157,694	18.29			
1959	9,419,531	179,071	19.01	8,707,692	165,454	19.00
1960	9,172,616	171,443	18.69	8,325,150	154,809	18.60
1961	9,175,683	164,738	17.95	8,331,599	149,839	17.98
1962	10,197,973	180,025	17.65	9,171,325	161,671	17.63
1963	10,838,408	186,037	17.16	9,719,200	166,513	17.13
1964	11,822,087	195,499	16.54			
1965	12,810,048	213,675	16.68	11,580,096	192,301	16.61
1966	13,911,314	240,997	17.32	12,639,292	218,239	17.27
1967	13,285,177	247,955	18.66	12,100,357	225,046	18.60
1968	12,735,800	269,757	21.18	11,433,100	241,817	21.15
1969	12,909,300	270,850	20.98	11,596,200	244,060	21.05
1970	13,065,500	248,878	19.05	11,601,600	199,488	17.19
1971	11,923,400	228,239	19.14	10,573,200	205,362	19.42
1972	13,038,000	237,722	18.23	11,726,800	216,773	18.49
1973	13,168,386	241,535	18.34	12,069,225	223,458	18.51
1974	13,695,800	319,631	23.34	12,611,800	294,940	23.39
1975	11,387,921	368,723	32.38	10,394,703	337,306	32.45
1976	12,110,400	382,613	31.59	10,854,100	344,658	31.75
1977	13,106,000	412,953	31.51	11,663,000	373,093	31.99
1978	14,170,300	442,146	31.20	12,588,400	396,807	31.52

1/ Shipments and value from Inorganic Chemicals, Annual Reports, The Bureau of the Census, U.S. Department of Commerce.

2/ Value - Net selling value f.o.b. plant (after discounts and allowances and excluding freight charges which may be absorbed by the producer).

Table 12--Ammonium nitrate (solution)
(fertilizer grade)
(100% NH_4NO_3) 1/

Calendar Year	Shipments & interplant transfers		
	Material (short tons)	Value 2/ (\$1,000)	Price/ ton
1954	40,378	2,220	54.98
1955	59,436	3,316	55.79
1956	72,907	3,734	51.22
1957	138,556	6,125	44.21
1958	64,589	3,591	55.60
1959	108,625	4,700	43.27
1960	98,080	4,792	48.86
1961	112,859	5,546	49.14
1962	115,637	5,989	51.79
1963	160,147	7,813	48.79
1964	265,515	14,568	54.87
1965	228,340	11,643	50.99
1966	240,855	12,111	50.28
1967	235,709	10,771	45.70
1968	255,760	9,297	36.35
1969	201,163	6,557	32.60
1970	262,461	12,756	48.60
1971	259,077	12,545	48.42
1972	232,372	11,967	51.50
1973	241,621	14,926	61.77
1974	285,881	23,747	83.07
1975	254,812	29,673	116.45
1976	237,540	28,733	120.96
1977	566,635	70,040	123.61
1978	505,917	60,495	119.57

Table 13--Ammonium nitrate (solid)
(fertilizer grade)
(100% NH_4NO_3) 1/

	Shipments & interplant transfers		
	Material (short tons)	Value 2/ (\$1,000)	Price/ ton
	950,170	65,103	68.52
	1,062,547	70,206	66.07
	1,153,584	72,548	62.89
	1,581,894	93,147	58.88
	1,470,392	90,338	61.44
	1,513,223	92,133	60.89
	1,580,213	98,008	62.02
	1,596,726	101,450	63.54
	1,615,803	100,882	62.43
	1,841,214	112,153	60.91
	1,990,246	118,854	59.72
	2,145,110	126,625	59.03
	2,475,461	133,342	53.87
	2,672,395	139,503	52.20
	2,981,171	137,947	46.27
	3,051,688	128,573	42.13
	3,327,121	147,784	44.42
	3,467,313	155,379	44.81
	3,739,426	158,364	42.35
	4,166,276	232,574	55.82
	3,829,957	359,168	93.78
	3,199,995	375,980	117.49
	3,621,324	348,750	96.30
	3,045,686	330,861	108.63
	3,013,395	301,404	100.02

1/ Shipments and value from Inorganic Chemicals, Annual Reports, The Bureau of the Census, U.S. Department of Commerce.

2/ Value - Net selling value f.o.b. plant (after discounts and allowances and excluding freight charges which may be absorbed by the producer).

Table 14--Nitrogen solutions
(100% N) ^{1/}

Calendar Year	Shipments & interplant transfers		
	N (short tons)	Value 2/ (\$1,000)	Price/ ton
1947		4,736	
1950		5,247	
1951	341,213	39,088	114.56
1952	362,590	42,431	117.02
1953	356,965	44,301	124.10
1954	452,695	56,571	124.96
1955	464,282	57,324	123.47
1956	490,743	53,806	109.64
1957	538,193	60,464	112.35
1958	613,827	68,470	111.55
1959	749,118	86,652	115.67
1960	786,027	96,859	123.23
1961	795,463	105,305	132.38
1962	864,698	113,621	131.40
1963	1,050,498	125,171	119.15
1964	1,100,937	132,703	120.54
1965	1,061,014	137,138	129.25
1966	1,132,760	132,435	116.91
1967	1,464,574	163,738	111.80
1968	1,120,861	120,724	107.71
1969	1,423,220	120,958	84.99
1970	1,641,294	124,973	76.14
1971	1,255,808	104,733	83.40
1972	1,511,367	136,838	90.54
1973	1,849,898	196,142	106.03
1974	2,052,283	345,873	168.53
1975	1,948,302	448,495	230.20
1976	1,908,159	434,555	227.74
1977	2,213,956	525,229	237.24
1978	1,887,053	431,455	228.64

Table 15--Ammonium sulfate
(other than coke-oven) ^{1/}
(100% (NH₄)₂ SO₄)

	Shipments & interplant transfers		
	Material (short tons)	Value 2/ (\$1,000)	Price/ ton
	186,917	9,069	48.52
	1,091,277	41,479	38.01
	585,148	26,025	44.48
	722,989	34,257	47.38
	516,494	24,519	47.47
	801,765	36,017	44.92
	1,087,324	46,432	44.92
	1,029,460	37,787	36.71
	1,089,476	36,130	33.16
	1,000,037	33,120	33.12
	1,045,544	34,628	33.12
	871,857	27,873	31.97
	856,486	29,413	34.34
	1,067,266	32,593	30.54
	1,208,093	33,384	27.63
	1,480,288	42,060	28.41
	1,766,225	49,469	28.01
	2,138,761	60,621	28.34
	1,849,287	55,408	29.96
	2,017,624	52,308	25.93
	1,576,789	38,671	24.53
	1,712,227	30,970	18.09
	1,990,282	32,945	16.55
	1,741,896	34,019	19.53
	1,868,799	52,319	28.00
	1,902,169	116,691	61.35
	1,726,902	123,569	71.56
	1,919,653	77,768	40.51
	2,126,377	115,855	54.48
	2,221,242	129,093	58.12

^{1/} Shipments and value from Inorganic Chemicals, Annual Reports, The Bureau of the Census, U.S. Department of Commerce.

^{2/} Value - Net selling value f.o.b. plant (after discounts and allowances and excluding freight charges which may be absorbed by the producer).

Table 16.--Urea (solid fertilizer)
sales 1/

Calendar Year	Material (short tons)	Total value (\$1,000)	Price per ton
1955	96,250	9,799	101.81
1956	144,169	13,322	92.41
1957	175,717	16,479	93.78
1958	224,620	20,977	93.39
1959	251,187	23,386	93.10
1960	302,963	26,965	89.00
1961	414,780	36,191	87.25
1962	446,600	38,933	87.18
1963	479,304	40,461	84.42
1964	529,486	42,826	80.88
1965	542,783	43,399	79.96
1966	707,546	60,861	86.02
1967	796,246	58,673	73.69
1968	955,967	59,894	62.65
1969	1,213,749	68,101	56.11
1970	1,106,350	66,036	59.69
1971	1,141,055	60,033	52.61
1972	1,244,744	64,208	51.58
1973	1,591,066	105,816	66.51
1974	1,261,934	175,366	138.97
1975	1,275,736	194,020	152.08
1976	1,750,241	217,588	124.32
1977	2,198,623	274,446	124.83
1978	2,698,040	324,470	120.26

Table 17.--Urea (liquid fertilizer)
sales 1/

Material (short tons)	Total value (\$1,000)	Price per ton
71,751	7,971	111.09
116,274	10,537	90.62
121,150	12,136	100.17
162,531	17,079	105.08
244,620	22,488	91.93
292,960	24,651	84.14
342,712	29,815	87.00
333,654	29,505	88.43
419,022	37,441	89.35
457,602	36,791	80.40
622,326	51,131	82.16
750,016	54,652	72.87
877,509	54,574	62.19
994,916	40,032	40.23
1,219,085	67,722	55.55
1,219,784	69,033	56.59
1,084,222	65,101	60.04
1,112,754	79,093	71.08
1,006,057	97,278	96.69
1,245,257	157,019	126.09
1,087,800	99,973	91.90
1,278,770	185,659	145.19
1,297,078	204,215	157.44

1/ Sales and value from Synthetic Organic Chemicals, Annual Reports, United States International Trade Commission.

Table 18.--Urea (feed) sales 1/

Calendar Year	Material (short tons)	Total value (\$1,000)	Price per ton
1956			
1957	65,057	6,160	94.69
1958			
1959	80,948	8,196	101.25
1960	94,611	8,624	91.15
1961	107,385	9,359	87.15
1962	114,106	10,027	87.87
1963	129,570	11,258	86.89
1964	128,963	11,325	87.82
1965	152,654	12,410	81.30
1966	192,027	14,570	75.87
1967	232,863	16,237	69.73
1968	277,442	16,108	58.06
1969	340,849	19,387	56.88
1970	292,402	16,820	57.52
1971	297,088	15,591	52.48
1972	305,840	15,418	50.41
1973	398,687	26,058	65.36
1974	349,959	43,239	123.55
1975	247,794	38,508	155.40
1976	201,840	26,585	131.71
1977	198,829	25,534	128.42
1978	211,593	23,022	108.80

Table 19.--Urea (total) sales 1/

Material (short tons)	Total value (\$1,000)	Price per ton
373,610	36,719	98.28
448,231	43,379	96.78
495,050	52,241	105.53
576,563	56,392	97.81
706,527	63,617	<u>2/</u> 90.04
885,982	76,173	<u>2/</u> 85.98
967,008	84,160	<u>2/</u> 87.03
1,014,844	87,412	<u>2/</u> 86.13
1,148,368	97,813	<u>2/</u> 85.18
1,233,441	99,587	<u>2/</u> 80.74
1,631,713	135,731	<u>2/</u> 83.18
1,896,303	138,282	<u>2/</u> 72.92
2,234,062	138,153	<u>2/</u> 61.84
2,657,714	133,779	<u>2/</u> 50.34
2,728,061	157,364	<u>2/</u> 57.68
2,919,761	165,844	<u>2/</u> 56.80
2,999,720	158,623	<u>2/</u> 52.88
3,378,355	228,103	67.52
2,896,476	348,233	120.23
3,009,548	431,168	143.27
3,262,000	376,363	115.38
3,959,911	568,736	143.62
4,427,355	583,103	131.70

1/ Sales and value from Synthetic Organic Chemicals, Annual Reports, United States International Trade Commission.

2/ Includes estimated value for sales of urea in nitrogen compounds.

Table 20--Phosphoric acid total
(100% P₂O₅) 1/

Calendar Year	Shipments & interplant transfers		
	P ₂ O ₅ (short tons)	Value 2/ (\$1,000)	Price/ ton
1947	35,546	5,766	162.21
1950	49,295	8,080	163.91
1951	67,251	12,131	180.38
1952	70,300	12,353	175.72
1953	105,762	17,504	165.50
1954	131,595	22,207	168.75
1955	161,085	26,281	163.15
1956	171,742	26,637	155.10
1957	217,427	33,445	153.82
1958	297,936	41,056	137.80
1959	344,454	51,222	148.70
1960	388,166	55,759	143.65
1961	382,743	53,580	139.99
1962	488,593	63,495	129.95
1963	613,660	76,547	124.74
1964	746,025	89,534	120.01
1965	918,499	101,743	110.77
1966	1,049,575	114,832	109.41
1967	1,076,718	120,261	111.69
1968	1,099,723	120,454	109.53
1969	1,463,781	143,895	98.30
1970	1,590,494	156,970	98.69
1971	1,784,752	164,427	91.87
1972	1,914,511	177,321	92.62
1973	1,958,732	208,808	106.60
1974	2,112,482	349,314	165.36
1975	2,189,114	401,247	183.29
1976	2,128,613	415,913	195.39
1977	2,381,138	459,557	193.00
1978	2,589,674	538,155	207.81

Table 21--Phosphoric acid, from
phosphorous
(100% P₂O₅) 1/

	Shipments & interplant transfers		
	P ₂ O ₅ (short tons)	Value 2/ (\$1,000)	Price/ ton
	30,675	5,257	171.38
	40,275	6,956	172.71
	54,289	10,476	192.97
	56,854	10,614	186.69
	93,189	15,759	169.11
	115,052	19,962	173.50
	141,407	23,835	168.56
	147,572	23,738	160.86
	175,856	28,390	161.44
	199,817	29,639	148.33
	227,134	36,990	162.86
	228,444	37,079	162.31
	239,075	37,891	158.49
	265,011	39,100	147.54
	285,012	41,566	145.84
	309,113	45,127	145.99
	324,538	43,117	132.86
	297,525	41,134	138.25
	308,805	42,994	139.23
	301,566	42,730	141.69
	273,517	45,172	165.15
	304,879	47,473	155.71
	251,504	42,142	167.56
	248,969	45,292	181.92
	212,870	46,487	218.38
	221,765	71,245	321.26
	224,925	96,840	430.54
	244,830	114,209	466.48
	277,128	120,366	434.33
	268,409	134,624	501.56

1/ Shipments and value from Inorganic Chemicals, Annual Reports, The Bureau of the Census, U.S. Department of Commerce.

2/ Value - Net selling value f.o.b. plant (after discounts and allowances and excluding freight charges which may be absorbed by the producer).

Table 22--Phosphoric acid, wet process (100% P₂O₅) 1/

Calendar Year	Shipments & interplant transfers			Commercial shipments only		
	P ₂ O ₅ (short tons)	Value 2/ (\$1,000)	Price/ ton	P ₂ O ₅ (short tons)	Value 2/ (\$1,000)	Price/ ton
1947	4,872	509	104.47			
1950	9,020	1,124	124.61			
1951	12,962	1,655	127.68			
1952	13,446	1,739	129.33			
1953	12,573	1,745	138.79			
1954	16,543	2,245	135.71			
1955	19,678	2,446	124.30			
1956	24,170	2,899	119.94			
1957	41,571	5,055	121.60			
1958	98,119	11,417	116.36			
1959	117,320	14,232	121.31	105,529	12,729	120.62
1960	159,722	18,680	116.95			
1961	143,668	15,689	109.20	108,682	11,945	109.91
1962	223,582	23,956	107.15	147,859	16,002	108.22
1963	328,648	34,981	106.44	243,089	25,430	104.61
1964	436,912	44,407	101.64	319,709	33,038	103.34
1965	593,961	58,626	98.70	414,414	41,043	99.04
1966	752,050	73,698	98.00	545,685	53,644	98.31
1967	767,913	77,267	100.62	537,296	53,035	98.71
1968	798,157	77,724	97.38	565,673	53,696	94.92
1969	1,190,624	98,723	82.92	961,043	77,957	81.12
1970	1,285,615	109,497	85.17	971,396	80,701	83.08
1971	1,533,248	122,285	79.76	1,194,602	94,345	78.98
1972	1,665,542	132,029	79.27	1,381,829	108,584	78.58
1973	1,745,862	162,321	92.97	1,487,591	144,067	96.85
1974	1,890,717	278,069	147.07	1,683,900	234,045	138.99
1975	1,964,289	304,407	154.97		266,334	
1976	1,883,783	301,704	160.16		261,342	
1977	2,104,010	339,191	161.21	1,755,057	285,554	162.70
1978	2,321,265	403,531	173.84	2,008,600	339,675	169.11

1/ Shipments and value from Inorganic Chemicals, Annual Reports, The Bureau of the Census, U.S. Department of Commerce.

2/ Value - Net selling value f.o.b. plant (after discounts and allowances and excluding freight charges which may be absorbed by the producer).

Table 23.--Nitrogen: N production, consumption, and foreign trade by leading countries, 1977-78

Country	Production		Imports		Exports		Consumption	
	Metric tons	Rank	Metric tons	Rank	Metric tons	Rank	Metric tons	Rank
United States	9,939,000	1	1,686,400	1	1,631,400	1	9,037,163	1
USSR	9,025,000	2	1/ 8,400	-	677,800	7	7,523,000	2
China	2/4,600,000	3	2/1,350,000	2	14,100	-	2/5,900,000	3
India	1,999,700	4	758,100	3	-	-	2,914,600	4
Poland	1,528,932	5	49,557	-	343,090	9	1/1,230,000	7
France	1/1,470,000	6	1/ 476,000	4	1/ 160,000	-	1/1,831,700	5
Netherlands	1,453,000	7	102,000	-	1,045,000	2	447,000	-
Japan	1,446,000	8	25,000	-	822,000	3	689,000	-
Romania	1,381,000	9	-	-	736,000	5	571,000	-
Canada	1/1,342,000	10	100,000	-	784,000	4	1/ 650,000	-
West Germany	1,304,712	-	473,556	5	362,965	8	1,324,702	6
United Kingdom	1,199,000	-	170,000	-	132,000	-	1,177,000	8
Italy	1,028,700	-	136,350	-	310,370	-	801,000	9
Belgium-								
Luxembourg	1/ 651,000	-	1/ 230,000	-	1/ 685,000	6	1/ 190,100	-
Mexico	611,200	-	1/ 183,000	-	-	-	794,200	10
Brazil	232,157	-	457,000	6	-	-	689,200	-
Turkey	1/ 187,300	-	1/ 407,400	7	-	-	1/ 665,700	-
Vietnam	1/ 34,000	-	1/ 254,000	9	-	-	1/ 288,000	-
Egypt	195,171	-	258,184	8	-	-	459,504	-
Denmark	116,836	-	248,921	10	5,842	-	373,710	-
Bulgaria	704,979	-	9,979	-	320,114	10	362,574	-
Total, other	9,160,860	-	2,645,420	-	2,049,008	-	9,848,856	-
World total	49,610,547		10,029,267		10,078,689		47,768,009	

1/ Unofficial figures.

2/ FAO estimate.

Source: FAO Fertilizer Yearbook 1978, Food and Agriculture Organization of the United Nations.

Table 24.--Phosphate: P₂O₅ production, consumption, and foreign trade by leading countries, 1977-78

Country	Production		Imports		Exports		Consumption	
	Metric tons	Rank	Metric tons	Rank	Metric tons	Rank	Metric tons	Rank
United States	7,480,700	1	208,800	6	3,003,000	1	4,618,211	2
USSR	5,586,000	2	8,200	-	125,500	7	5,104,000	1
France	1/1,560,000	3	1/ 580,000	1	1/ 135,000	6	1/1,839,700	3
China	2/1,386,900	4	2/ 125,000	9	2/ 2,800	-	2/1,512,000	5
Brazil	1,122,400	5	411,100	2	-----	-	2/1,533,500	4
Poland	966,245	6	-----	-	1/ 10,600	-	1/ 940,000	6
Australia	1/ 764,000	7	1/ 32,000	-	1/ 100	-	1/ 792,000	9
West Germany	722,484	8	308,685	3	121,244	8	873,217	7
Japan	696,000	9	69,000	-	12,000	-	747,600	10
India	670,000	10	163,900	8	-----	-	867,500	8
Canada	1/ 650,600	-	1/ 112,900	-	1/ 201,400	5	1/ 579,600	-
Belgium-								
Luxembourg	1/ 623,000	-	1/ 55,300	-	1/ 457,700	2	1/ 118,000	-
Romania	548,000	-	-----	-	1/ 82,500	10	466,000	-
Italy	493,700	-	268,480	4	53,570	-	622,900	-
Turkey	1/ 275,800	-	1/ 216,100	5	-----	-	1/ 613,500	-
Netherlands	1/ 261,600	-	1/ 42,400	-	1/ 211,400	4	1/ 86,600	-
Hungary	1/ 196,300	-	1/ 188,500	7	1,566	-	404,911	-
Pakistan	13,505	-	116,555	10	-----	-	155,567	-
Tunisia	246,424	-	-----	-	1/ 223,800	3	1/ 23,300	-
Morocco	1/ 184,800	-	-----	-	99,400	9	1/ 70,400	-
Total, other	5,566,382	-	1,559,785	-	723,204	-	6,311,540	-
World total	30,014,840		4,466,705		5,464,784		28,279,446	

1/ Unofficial figures.

2/ FAO estimate.

Source: FAO Fertilizer Yearbook 1978, Food and Agriculture Organization of the United Nations.

Table 25.--Potash: K₂O production, consumption, and foreign trade by leading countries, 1977-78

Country	Production		Imports		Exports		Consumption	
	Metric tons	Rank	Metric tons	Rank	Metric tons	Rank	Metric tons	Rank
USSR	8,347,000	1	-----	-	2,506,100	3	5,400,000	1
Canada	<u>1/6</u> 2,06,500	2	<u>1/</u> 20,000	-	<u>1/5</u> 828,000	1	<u>1/</u> 269,000	-
East Germany	3,229,000	3	-----	-	2,740,000	2	471,700	-
West Germany	2,445,382	4	170,307	-	1,248,763	4	1,183,188	5
United States	1,962,200	5	4,488,000	1	891,000	5	5,006,364	2
France	<u>1/1</u> 669,300	6	<u>1/</u> 362,100	-	<u>1/</u> 660,200	6	<u>1/1</u> 558,400	3
Israel	683,200	7	-----	-	609,950	7	17,480	-
Spain	551,800	8	-----	-	269,845	8	247,339	-
China	<u>2/</u> 320,000	9	<u>2/</u> 177,000	-	-----	-	<u>2/</u> 498,000	-
Italy	134,210	10	410,470	9	88,100	9	296,350	-
United Kingdom	121,000	-	463,000	8	35,000	10	416,000	-
Brazil	-----	-	927,165	3	-----	-	927,165	6
India	-----	-	598,900	6	-----	-	505,000	10
Japan	-----	-	702,000	4	-----	-	698,000	7
Belgium-	-----	-	-----	-	-----	-	-----	-
Luxembourg	-----	-	<u>1/</u> 350,000	10	-----	-	<u>1/</u> 165,000	-
Czechoslovakia	-----	-	627,000	5	-----	-	597,000	8
Hungary	-----	-	499,200	7	-----	-	523,919	9
Poland	-----	-	1,630,618	2	-----	-	<u>1/1</u> 450,000	4
Total, other	92,500	-	3,466,520	-	8,000	-	3,083,718	-
World total	25,762,092	-	14,892,280	-	14,884,958	-	23,313,623	-

1/ Unofficial figures.

2/ FAO estimate.

Source: FAO Fertilizer Yearbook 1978, Food and Agriculture Organization of the United Nations.

Potash (K_2O) - The United States ranked first as an importer, second ~~as a consumer~~, but fifth as a producer and exporter of K_2O in 1977-78 (table 25). The USSR continued as the leading producer. In 1975-76, the USSR became the leading consumer, but slipped to third as an exporter in 1977-78 behind second ranked East Germany. Canada is the leading exporter and the second ranked producer of K_2O .

Eleven countries are currently the world's significant sources of K_2O for fertilizer. Canada is the world's second largest source of K_2O . In 1977-78 Canada exported 94 percent of its production, of which 77 percent went to the United States. Israel exported 89 percent of its production, East Germany 85 percent, and Italy 66 percent. Spain and West Germany exported about one-half, while the USSR exported about a third of its production.

Of the major producers, Canada, East Germany, West Germany, Spain, and Israel exported more K_2O than they used at home. Poland, Brazil, Japan, Czechoslovakia, India, Hungary, United Kingdom, Italy, and Belgium-Luxembourg, in that order, are the leading 10 importers after the United States. All but Italy, United Kingdom, and Belgium-Luxembourg are ranked in the top 10 as users of K_2O .

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